What is claimed is:

1. A method of manufacturing an optical waveguide having a core layer and a cladding layer for covering the core layer,

wherein a silicon nitride film serving as the core layer is formed by plasmanizing a gas mixture containing methylsilane and at least any one of nitrogen (N_2) or ammonia (NH_3) to react.

2. A method of manufacturing an optical waveguide, according to claim 1, wherein the gas mixture contains at least any one of He or Ar.

3. A method of manufacturing an optical waveguide, according to claim 1, wherein the methylsilane is any one of monomethylsilane ($SiH_3(CH_3)$), dimethylsilane ($SiH_2(CH_3)_2$), trimethylsilane ($SiH(CH_3)_3$), or tetramethylsilane ($Si(CH_3)_4$).

4. A method of manufacturing an optical waveguide, according to claim 1, wherein the cladding layer is brought into contact with a dinitrogen monoxide (N_2O) or nitrogen (N_2) plasma.

5. A method of manufacturing an optical waveguide having a core layer and a cladding layer for covering the core layer,

wherein a silicon oxy-nitride film serving as the core layer or the cladding layer is formed by plasmanizing a gas mixture containing any one of methylsilane, alkyl compound having a siloxane bond, or

alkyl compound having an alkoxy bond, dinitrogen monoxide (N_2O), and at least any one of the nitrogen (N_2) or the ammonia (NH_3) to react.

6. A method of manufacturing an optical waveguide, according to claim 5, wherein a refractive index of the silicon oxy-nitride film is adjusted by controlling a flow rate of dinitrogen monoxide (N_2O), or nitrogen (N_2) or ammonia (NH_3).

7. A method of manufacturing an optical waveguide, according to claim 5, wherein the gas mixture contains oxygen (O_2).

8. A method of manufacturing an optical waveguide, according to claim 5, wherein the gas mixture contains at least any one of He or Ar.

9. A method of manufacturing an optical waveguide, according to claim 5, wherein the methylsilane is any one of monomethylsilane ($SiH_3(CH_3)$), dimethylsilane ($SiH_2(CH_3)_2$), trimethylsilane ($SiH(CH_3)_3$), or tetramethylsilane ($Si(CH_3)_4$).

10. A method of manufacturing an optical waveguide, according to claim 5, wherein the alkyl compound having the siloxane bond is any one of hexamethyldisiloxane (HMDSO: $(CH_3)_3Si\text{-}O\text{-}Si(CH_3)_3$), octamethylcyclotetrasiloxane (OMCTS), or octamethyltrisiloxane (OMTS).

11. A method of manufacturing an optical waveguide, according to claim 5, wherein the alkyl compound having the alkoxy bond is any one of dimethyldimethoxysilane

($Si(CH_3)_2(OCH_3)_2$), dimethyldiethoxysilane ($Si(CH_3)_2(OC_2H_5)_2$), or trimethoxysilane (TMS: $SiH(OCH_3)_3$).

12. A method of manufacturing an optical waveguide, according to claim 5, wherein the cladding layer is brought into contact with a dinitrogen monoxide (N_2O) or nitrogen (N_2) plasma.

13. A method of manufacturing an optical waveguide having a core layer and a cladding layer for covering the core layer,

wherein a silicon oxide film serving as the cladding layer is formed by plasmanizing a gas mixture containing methylsilane and dinitrogen monoxide (N_2O) to react.

14. A method of manufacturing an optical waveguide, according to claim 13, wherein a flow rate of dinitrogen monoxide (N_2O) is 20 times or more a flow rate of methylsilane.

15. A method of manufacturing an optical waveguide, according to claim 13, wherein the gas mixture contains oxygen (O_2).

16. A method of manufacturing an optical waveguide, according to claim 13, wherein the cladding layer is brought into contact with a dinitrogen monoxide (N_2O) or nitrogen (N_2) plasma.

17. A method of manufacturing an optical waveguide having a core layer and a cladding layer for covering the core layer, comprising the steps of:

forming the core layer by the optical waveguide

manufacturing method set forth in claim 1; and

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing methylsilane and dinitrogen monoxide (N_2O) to react.

18. A method of manufacturing an optical waveguide having a core layer through which a light is propagated mainly and a cladding layer for covering the core layer, comprising the steps of:

forming the core layer by the optical waveguide manufacturing method set forth in claim 1; and

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing any one of methylsilane, alkyl compound having a siloxane bond, or alkyl compound having an alkoxy bond, dinitrogen monoxide (N_2O), and at least any one of nitrogen (N_2) or ammonia (NH_3) to react.

19. A method of manufacturing an optical waveguide having a core layer and a cladding layer for covering the core layer, comprising the steps of:

forming the core layer by the optical waveguide manufacturing method set forth in claim 5; and

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing methylsilane and dinitrogen monoxide (N_2O) to react.

20. A method of manufacturing an optical waveguide having a core layer through which a light is propagated mainly and a cladding layer for covering the core layer,

comprising the steps of:

forming the core layer by the optical waveguide manufacturing method set forth in claim 5; and

forming a silicon oxide film as the cladding layer by plasmanizing a gas mixture containing any one of methylsilane, alkyl compound having a siloxane bond, or alkyl compound having an alkoxy bond, dinitrogen monoxide (N_2O), and at least any one of nitrogen (N_2) or ammonia (NH_3) to react.

21. An optical waveguide formed by a method of manufacturing an optical waveguide set forth in claim 17.

22. An optical waveguide formed by a method of manufacturing an optical waveguide set forth in claim 18.

23. An optical waveguide formed by a method of manufacturing an optical waveguide set forth in claim 19.

24. An optical waveguide formed by a method of manufacturing an optical waveguide set forth in claim 20.